User Manual WH4013

Single Phase Electronic Electricity Meter

for

DIN Rail-Assembling

Date	11.06.2014
Last changes	17.03.2015

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Notice:

This manual dscribes electricity meters of the type DVH4013. It includes all necessarry informations for assembling, setting into operation and use of the meter.

Used Symbols

	Danger through Electric Voltages The symbol indicates warnings, which may lead to personal injuries or death if it is ignored. Take all necessarry precautions to avoid danger !	
	Warning The symbol indicates warnings to a possible dangerous situation which may lead to personal injuries or damage to properties. Avoid dangerous situations !	
	Attention! „Attention" indicates warnings, which may lead to damage of properties if not observed.	
	Notice „Noice" indicates important information in the manual.	
	The symbol is printed on the nameplate an references to further informations in a instruction manual prepared for the customer.	

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Abbreviations

+A	Import actve energy (to customer)
-A	Expot active energy (from customer)
dd	day
DIN	German Institut for Standards
EN	European Standard
FNN	Forum Netztechnik/Netzbetrieb im VDE
FIFO	First IN-First OUT
HH or hh	Hour
IEC	International Electrotechnical Commision
Imp/kWh	quantity of pulses each kWh
Imp/kvarh	quantity of pulses each kvarh
IR	Infrared
LCD	Liquid Crystal Display
LED	Light Emitting Diode
MM or mm	Month or Minutes
OBIS	Object Identification System
+P	Import active power
-P	Export active power
PTB	Physikalisch Technische Bundesanstalt
+Q	Import reactive Power
-Q	Export reactive Power
RTC	Real Time Clock
+R	Import reactive energy (inductive)
-R	Export reactive energy (kapacitive)
SS or ss	Seconds
TOU	Time Of Use
Tx	Tariff (z.B. T1 Tariff1, T2 Tariff2, ...)
VDE	Association of Electrotechnic/Elektronic/Informationtechnic e.V.
yyyy	Year

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1 Further Documents

Document			
Nr	**Document**	**Version/from**	**Content**
D1	User Manual WH40 Appendix A	V1.0/11.06.2014	Communication Interface and Implemented Communication Prtocol
D3	Product Drawings WH40	V1.0/11.062014	CADs, BOM, Schematics

Tab. 1 Further Dokuments

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2 Properties

2.1 Common

Welcome to use single phase Din Rail meter. Let's introduction it's functions and operations of this product.

This meter is 1phase – 2wire direct connected electricity meter. It adopts the advanced technology of LSI (Large Scale Integrated circuit) and digital signal processing. The craftworks of our product are exquisite and the functions provided are comprehensive and client-oriented. The energy meter is an intelligent instrument equipped with leading technology.

The functionality of the single phase Din Rail energy meter includes active energy and demand measurement, instantaneous measurement for voltage, current, frequency, power factor and power, RS485 communication, anti-tamper protection and event record, power quality detection, load profile, pulse output for test, self check.

2.2 Appropriate Use

The electricity meter WH40 and all versions of it are allowed to be used for measuring electrical energy only.

2.3 Properties

Type	Single phase electricity meter direct connection
Voltage	
Nominal voltage U_n	230 V_{AC}
Voltage range	0.8 – 1.15 U_n
Frequency	
Nominal frequency f_n	50 Hz
Frequency range	0.98 – 1.02 f_n
Current	
Reference current $I_{ref} = I_b = 10 I_{tr}$	5 A
Maximum current I_{max}	65A
Minimum current I_{min}	0.25 A
Starting current I_{st}	$\leq 0.004 I_b$
Accuracy	
Cl. B	Class B in compliance with DIN EN 50470-1,-3
Measuring Active Energy	
One Energy Direction	+A reverse locking
Meter constant	
LED-Output	1000 Imp/(kWh
Display	
LCD	6 digit
Life cycle	> 12 years
RS485- Data Interface	
Connector	RJ10-Socket
Parameter	9.600 bps, 8E1 (setable)
Communication protocol	Modbus RTU
Power Consumption	
Voltage circuit	< 2 W / 10 VA at U_n
Current circuit	< 4 VA at I_b
Temperature Range	
Typical Operation	-25°C to +70°C
Storage	-40°C to +85°C
EMC Properties	
Isolation	4 kV AC, 50 Hz, 1min

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High Voltage	10 kV, Impuls 1,2/50 μs
Housing	
Dimension	DIN-Rail 86x35x62 mm
Material	fiber-glass reinforced Polycarbonat (flame resistant EN 62053-21, recyclable)
Class of protection	II
Degree of protection	IP 51
Weight	
Weight	appr. 0,25 kg

Tab. 2: Technical Properties

2.3.1   Technical Standards

IEC 62053-21: Static meters for active energy (classes 1 and 2)
IEC 62052-11: Electricity metering equipment (AC)-General requirements, tests and test conditions – part 11: metering equipment
IEC 62053-31: Electricity metering equipment (AC)- Particular requirements – part 31: Pulse output devices for electromechanical and electronic meters (two wires only)
EN 50022:   Low voltage switchgear and controlgear for industrial use; mounting rails, top hat rails, 35 mm wide, for snap-on mounting of equipment

[1] PTB Requirements:
> [1.1] „Anforderungen an elektronische und software-gesteuerte Messgeräte und Zusatzeinrichtungenfür Elektrizität, Gas, Wasser und Wärme",PTB-A 50.7 2002
> [1.2] „Messgeräte für Elektrizität, Elektrizitätszähler und deren Zusatzeinrichtungen", PTB-A 20.1, Dezember 2003

[2] Legal Directives:
> "Legal Metrology Guide/ general rules", published in Federal Journal Nr 108a on June 15th 2002

[3] WELMEC-Guide 7.2, software guide

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3   Safety

3.1   Responsibility

The owner or provider is responsible for the proper use of the device. The installation, putting into operation and reinstallation of the meter is only allowed to be done by electrically skilled persons, which got knowledge about the contents of this user manual.

3.2   Common safety instrcutions

For installation, setting into operation and deinstallation of the device the local requirements for safety requirements has to be observed.

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Danger

Inappropriate use of parts under high voltage may lead to grave injuries and accidents, which may be fatal even with 230V.
The conductors which are connected to the device must be disconnected to the mains during assembling and installation. It must be used a prevention for being switched on accidentally.

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The device is not allowed to be used out of specifications.

3.3   Service- and warranty instructions

Damaged devices can't be repaired by yourself. The warranty and liablity will be terminated with opening the device. The same applies to damages caused by external influences.
For the device no servicing is required.

3.4   Disposal (product end of life information)

This meter was designed and built by DZG to provide many years of service, and is backed by our commitment to provide high quality support. When it eventually reaches the end of its serviceable life, it should be disposed of in accordance with local or national legislation.

3.5   Environment

This meter is designed for indoor use or in a cabinet environment only (avoiding extreme weather conditions) in accordance with IEC 62052-11 and IEC 62053-21, with the terminal cover fitted.

3.6   Service and Warranty

This meter product is warranted against defects in material and workmanship for a period of one year from date of shipment. During the warranty period DZG will at its option, either repair or replace products which prove to be defective. For warranty service or repair, this product must be returned to a service facility designated by DZG. DZG does not warrant that the operation of the meter or firmware will be uninterrupted or error free.
Damaged devices can't be repaired by yourself. The warranty and liablity will be terminated with opening the device. The same applies to damages caused by external influences.
For the device no servicing is required.

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4 Typecode

1	2	3	.	4	5		
							direct connection
W							two-wire single-phase meter
	H40						Static meter
		13					range Imax / Iref =1300%

Tab. 3: Typecode

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5   Assembling and Installation

5.1   Assembling

The meter constructed for assembling on DIN-rail TH 35-7.5 according to IEC 60715.
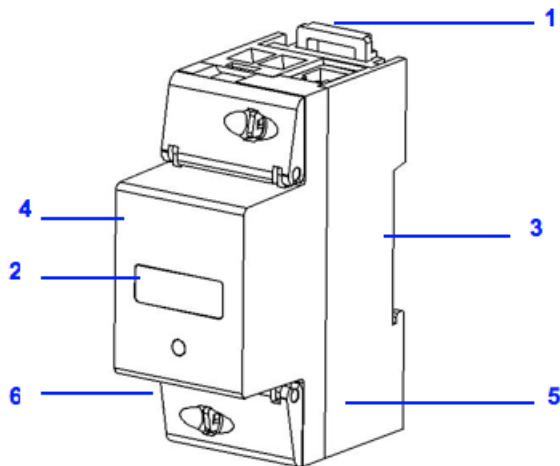
Abb 1: Housing

Nr	Element
1	Meter Hook
2	LCD
3	DIN rail space
4	Meter cover
5	Meter case
6	Terminal Block with cover
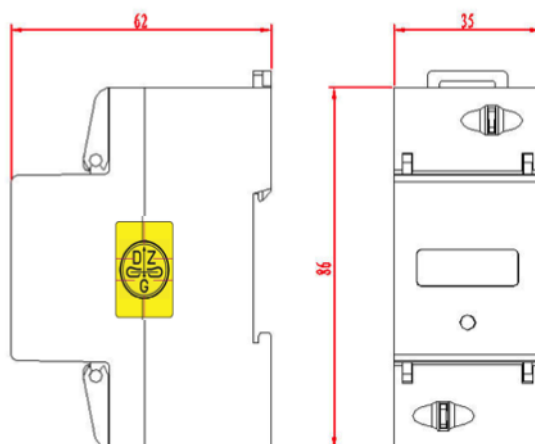
Abb 2: Housing Dimensions

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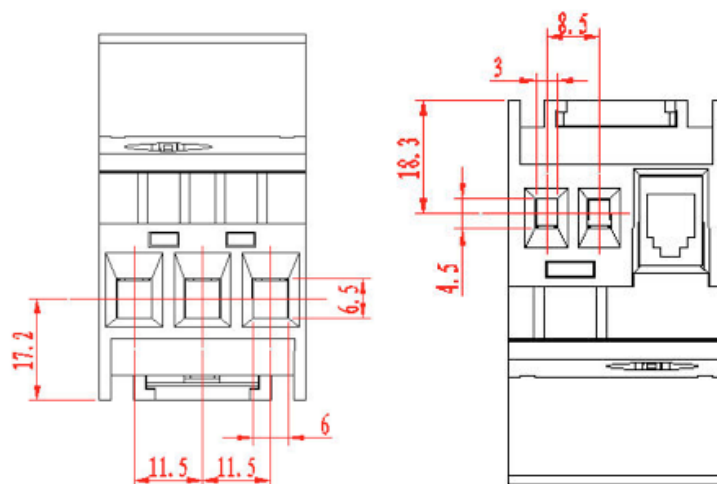
Abb 3: Terminal Block

5.2 Installation

The connection diagramm printed on the housing needs to be considered connecting the meter to the mains power.
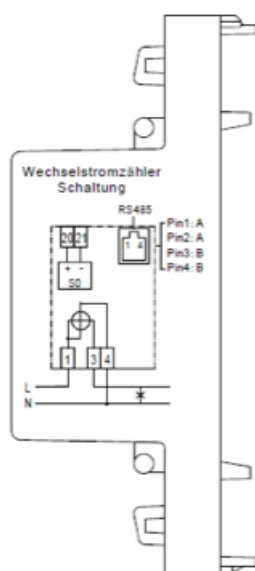
Abb 4: Connection diagramm

Nr	Terminal	Terminal Nr	Terminal-Ø[mm]	Terminal screw	torque M [Nm]
1	Current In L1	1	6,5	M4 Pozidrive PZ2	M < 2,7Nm
2	Current Out L1	3			
3	Neutral wire	4			
4	S0-Output (pos voltage)	20			
5	S0-Output (neg. voltage)	21			

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Data Interface					
8	RS485 A	PIN 1		RJ10 (female)	
	RS485 A	PIN 2			
	RS485 B	PIN 3			
	RS485 B	PIN4			

Tab. 4: Terminal block

Warning

The requirements of the netprovider need to be fullfilled.
Selective hedges has to be used according requirements of the netproviders.

Attention!

Damage of the terminals due to high torque
The specified maximum torques must not be exceeded !
Ensure that the connected lines are fixed with the needed torque compliant to EN
60999 for a safe connection. The needed torque depends on the type of used lines and
the maximum current.

5.3   Protection Housing

The assembled meter base and meter cover will be protected against unauthorized opening with a
manufacturer label (format 18x26 mm, corner radius 0,5 mm) on the side of the housing.
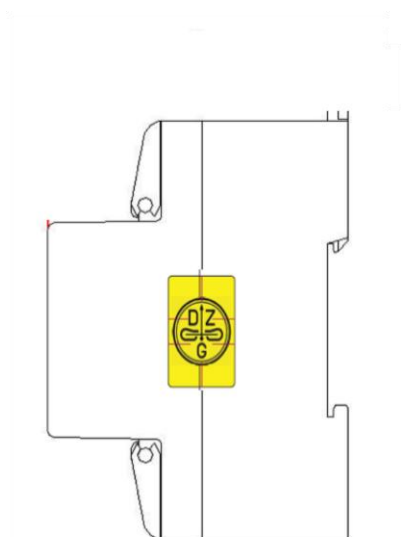
Abb 5: Label Protection Housing

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6 Firmware Version

The firmware of the meter has the version number FW1.05 with the checksum 3B0987(Hex). The firmware version is printed to the nameplate.

7 Nameplate
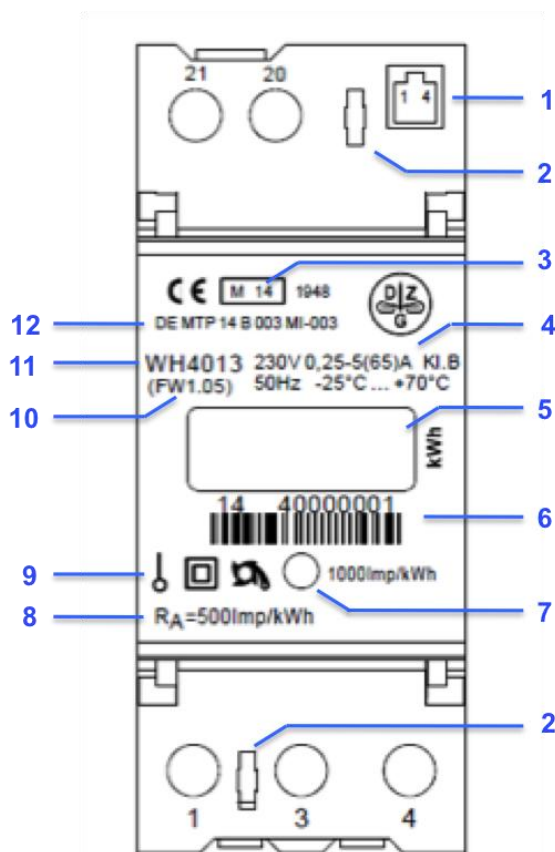
Abb 6: Nameplate

Nr	Element	Function
1	RJ10 female	RS485 interface
2	sealing terminal cover	
3	year of certification	
4	electrical characteristics	
5	LCD	6 digits without decimal
6	serial number	number and barcode 128 The first 2 charakter are used for the year of production f.e. 14 = 2014
7	LED	test LED 1000 Imp/kWh
8	constant S0-pulse output	500 Imp/kWh
9	symbols	single phase, protection class, reverse locking
10	firmware version	FW 1.05
11	type code	
12	number approval document	

Tab. 5: Description Nameplate

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8   LCD-Display

The LCD has the following format:

- LCD size: 24.39mm × 9mm
- Digit size: 2.72mm × 6mm

Abb 7: LCD

The counter value of energy for +A is displayed. On the right side the unit kWh is printed on the housing.

9   RS485 Interface

The interface is provided for meter reading and programming according to Modbus-RTU via RS485. The pin definition is as following:

Pin 1—A
Pin 2—A
Pin 3—B
Pin 4—B
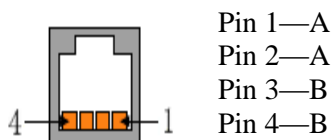
Abb 8: Pin Definition RS485

The Baudrate can be selected with 9600, 19200 or 38400 Bd.
The Modbus-RTU protocoll is described in an own document

10 Test LEDs

The meter has one pulse LED for active energy with 1000 Imp/kWh.
The ON-time of a pulse is 40 ms.

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11 Components

11.1 Blockdiagramm
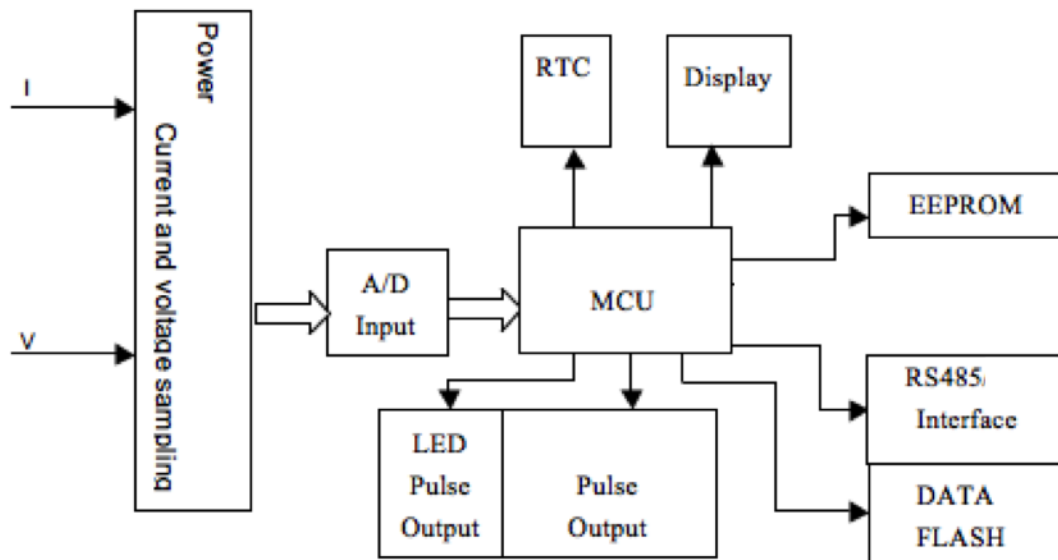
Abb 9: Blockdiagramm

Current measuring:	manganin shunt
Voltage measuring:	resistor devider
A/D:	analog to digital converter for the sampled voltage and current
MCU:	Micro Controller Unit
RTC:	real Time Clock
Communication interface:	RS485-Interface (RJ10 female)
Data storage:	nonvolatile storage for energy register +A and meter parameter in EEPROM and Dataflash memory.
Display:	LCD with 6 digits
LED Pulse output:	active energy +A, 1000 Imp/kWh
Pulse Output:	S0-Pulse Output for active energy +A, 500 Imp/kWh

11.2 Real time clock (RTC)

AC power and super capacitor are powering the internal clock.
Built-in 32.768kHz quartz oscillator, frequency adjusted for high precision ($\pm 5 \times 10^{-6}$ at ambient temperature 25 °C)

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accuracy: $<\pm$ 0.5 sec/day at 23 °C. The variation of the time-keeping accuracy with temperature is less than 0.1s/°C/day).

The RTC usesGregorian calendar. (100years calendar including leap year).

The time and date can be set through the RS485-interface by software.

11.3 S0-Pulse Output

The meter provides on terminal 20 (positiv voltage) and 21 (negative voltage) a puls output for active energy +A according IEC 62053-31:

Maximum voltage: 80 V_{DC} (standard is 27 V)
Maximum current: 60 mA (standard 27 mA)
Pulse constant: 500 Imp/kWh
Pulse duration: 80 ms

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12 Functionality

12.1 Measurement

The meter measures one phase active energy +A with accuracy class B.

The line current is measured with a shunt-resistor. The line-voltage is divided with resistors to a voltage level which can be measured by the A/D-converter unit.
The voltages of the shunt resistor and voltage divider are measured with an A/D unit which supports the MCU with the realtime digital values for voltage and current.
The MCU calculates in realtime active power, energy and demand based on the converted analog signals for voltage and current.
The energy for +A is counted in an register wich is stored in a non volatile memory. This value is diaplayed on the LCD.
The measured energy is indicated on an LED with 1000 Imp/kWh used for testing the accuracy of the meter. Additionally the energy is put to a S0-puls output with 500 Imp/kWh used for external registration devices.

12.2 Firmware Architecture

The functionality of the meter is periodically processed in the main loop of the application layer. The main loop is interupted by interrupt service routines based on timer events and asynchron events.

Interrupt Service Routines (ISR)

Basic timer 250us, 1ms,..

Second index

LED pulse

S0-Pulse

power line state

RX,TX interface handler

error detection

Power ON → initialize board → power off detected ?

NO → Energy accumulation → Communication interface (RS485) → Main Loop

YES → Save data (EEPROM) → End
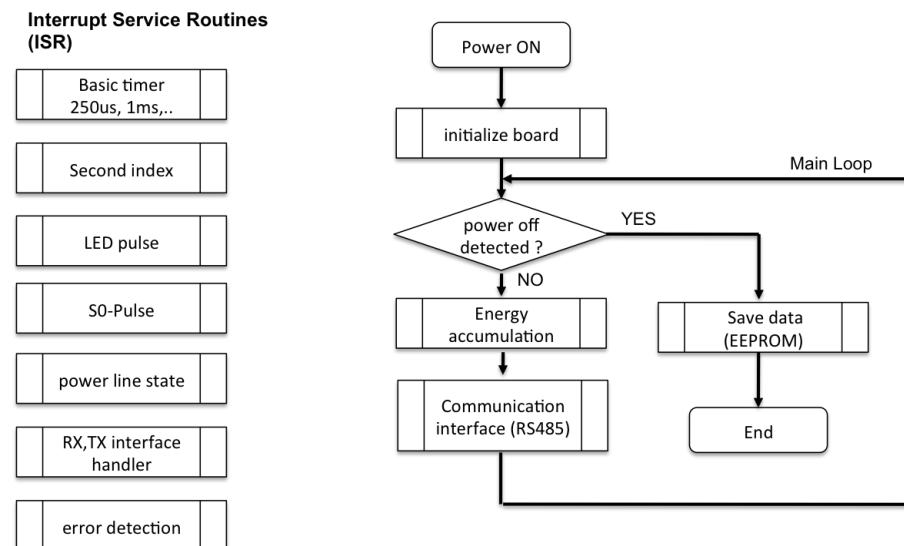
12.3 Energy Checksum Mechanism

The energy register is stored once in the internal RAM of the MCU and once in the external EEPROM. In each memory two backups are available. The contents, original and backup, are stored together with a checksum.
Before the current energy concumption ($\triangle$ E) is accumulated to the energy registersin the RAM or EEPROM the energy registers are red out and the checksum is controlled. If the check sum is not correct the backup registers are used.
The current $\triangle$ E is accumulated to the energy register and the check sum is calculated new. This informations are stored to the memories. Finally a new back up of the energy registers and the checksum is created.

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12.4   Fatal Error

The meter has an internal software watch dog. If the firmware is running abnormally without feeding the watch dog periodically, the watch dog will reset the main CPU. Watchdog events lead to fatal error if the events occur more times within a defined time slot.

The meter has implemented a self-monitoring system. If the meter recognizes no proper operation (measurement, memory check, watchdog events) so that billing relevant values may not be used anymore it displays a „ Fatal Error". This status will be indicated with the flashing energy counter value for +A (1Hz).

12.5   Additional Functions

This functions are not approved according MID. The values may be used for information and not for billing purposes.

12.5.1 Demand channel

The demand channel the supports the following demand measurements:
Active import demand of total energy

The meter supports block methods for demand calculation:
The demand interval is programmable for 60, 120, 300, 600, 900 or 1200 seconds.

The demand can be reset by:

No.	Ways of Demand Reset	Description
1	Demand reset by software	Demand can be reset by software through RS485 interface

There is time limit between two demand reset actions for 30minutes.
When demand reset occurs, the current energy and the maximum demand will be automatically saved for the last month. The energy of current month will be continuously cumulated, and the demand will be reset and restart to record.

12.5.2 History data record

There are 20 months history energy and demand data.
All this history data can be read out via Software through RS485 interface.

12.5.3 Instantaneous parameter measurements

The instantaneous values can be be read out via RS485 interface.
- Voltage and current
- Power factor
- Active power
- Frequency

12.5.4 Load profile

Load profile interval is configurable with 1, 2, 5, 10, 15, 30, 60, 120, 300, 600, 900 , 1800, 3600 seconds.
Memory capable: 8 channels(the first channel should be time) with together 43200 entries.

The load profile data are stored with time stamp.

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- first channel time stamp
- up to 7 further channel with values selectable according the following list:

value	
Active import energy	√
Active import demand	√
Active import power	√
Voltage	√
Current	√
Power factor	√
Frequency	√

Note: √ means corresponding item with options
      ∕ means corresponding item without options

12.5.5 Second index

The second indexis a continously incremented second counter. It is used as time stamp for maximum demand measurement, all events inside the meter, such as time stamp for power outage, clock synchronization etc.

12.5.6 Security functions

The register for energy, demand, meter parameter and event records will be saved in non volatile memory if the power is off.

The meter detects and registers current status and events:

Event logging with date and time:
- power off (last 20 events)
- time synchronisation (last 20 events)
- time asynchron (last 20 entries)

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13 Registers

13.1 Instantanous data

Acess Level				
R: read only				
R/W: read/write				
W(M): write only in manufacturer mode (meter cover opened)				
Modbus Address	**Register**	**Access level**	**Units**	**LCD displayed**
0000	Total active import power	R	W	no
0004	voltage	R	V	no
000A	current	R	A	no
0010	Power factor	R		no
0012	Frequency	R	Hz	no
0014	The total Import demand	R	W	no

Tab. 6: Instantanous Data

13.2 Basic Parameter

Acess Level				
R: read only				
R/W: read/write				
M: write only in manufacturer mode (meter cover opened)				
Modbus Address	**Register**	**Acess level**	**Units**	**LCD displayed**
0400	Second Index	R/W(M)	s	no
0402	Meter ID	R/W(M)		no
0405	SoftWare Date	R/W(M)		no
0407	SoftWare time	R/W(M)		no
0409	Clock Asynchronous Period	R/W	s	no
040B	Communication baud	R/W	bps	no
040C	Rated voltage	R	V	no
040D	Rated current	R	A	no
040E	Frequency	R	Hz	no
040F	Maximum current	R	A	no
0410	Active constant	R	imp/kWh	no
0411	Active remote constant	R/W(M)	imp/kWh	no
0412	Demand reset number	R		no
0413	Status Register	R/W(M)		no
0800	Demand interval	R/W	s	no

Tab. 7: Basic Parameter

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13.2.1 Status Register

Bit	Meaning
0	RTC error
1	EEPROM Error
2	Dtaflash Error
3	reserved
4	reserved
5	reserved
6	reserved
7	reserved
8	reserved
9	reserved
10	reserved
11	reserved
12	reserved
13	reserved
14	reserved
15	reserved

Tab. 8: Status Register

13.3 Load Profile Parameter

Acess Level				
R: read only				
R/W: read/write				
M: write only in manufacturer mode (meter cover opened)				
Modbus Address	Register	Acess level	Units	LCD displayed
0C00	Load profile interval	R/W	s	no
0C01	LP recorded number	R		no
0C02	Load profile channels config 1 ---Second Index	R	s	no
0C03	Load profile channels config 2	R/W		no
0C04	Load profile channels config 3	R/W		no

Tab. 9: Load Profile Parameter

0C05	Load profile channels config 4	R/W		no
0C06	Load profile channels config 5	R/W		no
0C07	Load profile channels config 6	R/W		no
0C08	Load profile channels config 7	R/W		no
0C09	Load profile channels config 8	R/W		no

13.4 Display Settings

Acess Level R: read only R/W: read/write M: write only in manufacturer mode (meter cover opened)				
Modbus Address	**Register**	**Acess level**	**Units**	**LCD displayed**
1000	Auto Mode Scrolling duration	R/W (M)		no
1002	In the Test Mode	R/W(M)		no
1010	Auto display item count	R/W(M)		no
1012	Test display item count	R/W(M)		no
1100	Auto Mode Display Items 1-32	R/W(M)		no
1140	Test Mode Display Items 1-32	R/W(M)		no

Tab. 10: Display Settings

13.5 Energy Register

The meter saves up to 20 previous registers. The save function is triggered via RS485 data interface.

Acess Level R: read only R/W: read/write M: write only in manufacturer mode (meter cover opened)				
Modbus Address	**Register**	**Acess level**	**Units**	**LCD displayed**
4000	Current_Total-(Import kWh)	R	kWh	yes
4200	PREV1_Total-(Import kWh)	R	kWh	no
4400	PREV2_Total-(Import kWh)	R	kWh	no
4600	PREV3_Total-(Import kWh)	R	kWh	no
4800	PREV4_Total-(Import kWh)	R	kWh	no
4A00	PREV5_Total-(Import kWh)	R	kWh	no
4C00	PREV6_Total-(Import kWh)	R	kWh	no
4E00	PREV7_Total-(Import kWh)	R	kWh	no
5000	PREV8_Total-(Import kWh)	R	kWh	no
5200	PREV9_Total-(Import kWh)	R	kWh	no
5400	PREV10_Total-(Import kWh)	R	kWh	no
5600	PREV11_Total-(Import kWh)	R	kWh	no
5800	PREV12_Total-(Import kWh)	R	kWh	no

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5A00	PREV13_Total-(Import kWh)	R	kWh	no
5C00	PREV14_Total-(Import kWh)	R	kWh	no
5E00	PREV15_Total-(Import kWh)	R	kWh	no
6000	PREV16_Total-(Import kWh)	R	kWh	no
6200	PREV17_Total-(Import kWh)	R	kWh	no
6400	PREV18_Total-(Import kWh)	R	kWh	no
6600	PREV19_Total-(Import kWh)	R	kWh	no
6800	PREV20_Total-(Import kWh)	R	kWh	no

Tab. 11: Energy Registers

13.6 Maximum Demand Register

The meter saves up to 20 Maximum Demand register. The demand interval is defined in regsiter 0800. The Damand register are not displayed on the LCD.

Acess Level R: read only R/W: read/write W(M): write only in manufacturer mode (meter cover opened)			
Modbus Address	**Register**	**Acess level**	**Units**
8000	Current_Maximum demand-(Import kW)	R	kW
C000	Current_Maximum demand-(Import kW) Second Index	R	s
8200	PREV1_Maximum demand-(Import kW)	R	kW
C200	PREV1_Maximum demand-(Import kW) Second Index	R	s
8400	PREV2_Maximum demand-(Import kW)	R	kW
C400	PREV2_Maximum demand-(Import kW) Second Index	R	s
8600	PREV3_Maximum demand-(Import kW)	R	kW
C600	PREV3_Maximum demand-(Import kW) Second Index	R	s
8800	PREV4_Maximum demand-(Import kW)	R	kW
C800	PREV4_Maximum demand-(Import kW) Second Index	R	s
8A00	PREV5_Maximum demand-(Import kW)	R	kW
CA00	PREV5_Maximum demand-(Import kW) Second Index	R	s
8C00	PREV6_Maximum demand-(Import kW)	R	kW
CC00	PREV6_Maximum demand-(Import kW) Second Index	R	s
8E00	PREV7_Maximum demand-(Import kW)	R	kW
CE00	PREV7_Maximum demand-(Import kW) Second Index	R	s
9000	PREV8_Maximum demand-(Import kW)	R	kW
D000	PREV8_Maximum demand-(Import kW) Second Index	R	s
9200	PREV9_Maximum demand-(Import kW)	R	kW
D200	PREV9_Maximum demand-(Import kW) Second Index	R	s
9400	PREV10_Maximum demand-(Import kW)	R	kW
D400	PREV10_Maximum demand-(Import kW) Second Index	R	s
9600	PREV11_Maximum demand-(Import kW)	R	kW
D600	PREV11_Maximum demand-(Import kW) Second Index	R	s
9800	PREV12_Maximum demand-(Import kW)	R	kW
D800	PREV12_Maximum demand-(Import kW) Second Index	R	s
9A00	PREV13_Maximum demand-(Import kW)	R	kW
DA00	PREV13_Maximum demand-(Import kW) Second Index	R	s
9C00	PREV14_Maximum demand-(Import kW)	R	kW

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DC00	PREV14_Maximum demand-(Import kW) Second Index	R	s
9E00	PREV15_Maximum demand-(Import kW)	R	kW
DE00	PREV15_Maximum demand-(Import kW) Second Index	R	s
A000	PREV16_Maximum demand-(Import kW)	R	kW
E000	PREV16_Maximum demand-(Import kW) Second Index	R	s
A200	PREV17_Maximum demand-(Import kW)	R	kW
E200	PREV17_Maximum demand-(Import kW) Second Index	R	s
A400	PREV18_Maximum demand-(Import kW)	R	kW
E400	PREV18_Maximum demand-(Import kW) Second Index	R	s
A600	PREV19_Maximum demand-(Import kW)	R	kW
E600	PREV19_Maximum demand-(Import kW) Second Index	R	s
A800	PREV20_Maximum demand-(Import kW)	R	kW
E800	PREV20_Maximum demand-(Import kW) Second Index	R	s

Tab. 12: Maximum Demand Registers

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13.7 Logging Registers

The logging register are not displayed on the LCD.

13.7.1 Logging Demand Resets

Acess Level R: read only R/W: read/write W(M): write only in manufacturer mode (meter cover opened)			
Modbus Address	**Register**	**Acess level**	**Units**
2000	Demand reset record01	R	s
2002	Demand reset record02	R	s
2004	Demand reset record03	R	s
2006	Demand reset record04	R	s
2008	Demand reset record05	R	s
200A	Demand reset record06	R	s
200C	Demand reset record07	R	s
200E	Demand reset record08	R	s
2010	Demand reset record09	R	s
2012	Demand reset record10	R	s
2014	Demand reset record11	R	s
2016	Demand reset record12	R	s
2018	Demand reset record13	R	s
201A	Demand reset record14	R	s
201C	Demand reset record15	R	s
201E	Demand reset record16	R	s
2020	Demand reset record17	R	s
2022	Demand reset record18	R	s
2024	Demand reset record19	R	s

Tab. 13: Logging Demand Registers

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13.7.2 Logging Power Outages

Acess Level			
R: read only			
R/W: read/write			
W(M): write only in manufacturer mode (meter cover opened)			
Modbus Address	**Register**	**Acess level**	
2400	Power Outages LOG01	R	
2404	Power Outages LOG02	R	
2408	Power Outages LOG03	R	
240C	Power Outages LOG04	R	
2410	Power Outages LOG05	R	
2414	Power Outages LOG06	R	
2418	Power Outages LOG07	R	
241C	Power Outages LOG08	R	
2420	Power Outages LOG09	R	
2424	Power Outages LOG10	R	
2428	Power Outages LOG11	R	
242C	Power Outages LOG12	R	
2430	Power Outages LOG13	R	
2434	Power Outages LOG14	R	
2438	Power Outages LOG15	R	
243C	Power Outages LOG16	R	
2440	Power Outages LOG17	R	
2444	Power Outages LOG18	R	
2448	Power Outages LOG19	R	
244C	Power Outages LOG20	R	

Tab. 14: Logging Power Outages

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13.7.3 Logging Clock Synchronisation

Acess Level			
R: read only			
R/W: read/write			
W(M): write only in manufacturer mode (meter cover opened**)**			
Modbus Address	**Register**	**Acess level**	
2600	Clock synchronous LOG01	R	
2606	Clock synchronous LOG02	R	
260C	Clock synchronous LOG03	R	
2612	Clock synchronous LOG04	R	
2618	Clock synchronous LOG05	R	
261E	Clock synchronous LOG06	R	
2624	Clock synchronous LOG07	R	
262A	Clock synchronous LOG08	R	
2630	Clock synchronous LOG09	R	
2636	Clock synchronous LOG10	R	
263C	Clock synchronous LOG11	R	
2642	Clock synchronous LOG12	R	
2648	Clock synchronous LOG13	R	
264E	Clock synchronous LOG14	R	
2654	Clock synchronous LOG15	R	
265A	Clock synchronous LOG16	R	
2660	Clock synchronous LOG17	R	
2666	Clock synchronous LOG18	R	
266C	Clock synchronous LOG19	R	
2672	Clock synchronous LOG20	R	
2800	Clock asynchronous LOG01	R	
2802	Clock asynchronous LOG02	R	
2804	Clock asynchronous LOG03	R	
2806	Clock asynchronous LOG04	R	
2808	Clock asynchronous LOG05	R	
280A	Clock asynchronous LOG06	R	
280C	Clock asynchronous LOG07	R	
280E	Clock asynchronous LOG08	R	
2810	Clock asynchronous LOG09	R	
2812	Clock asynchronous LOG10	R	
2814	Clock asynchronous LOG11	R	
2816	Clock asynchronous LOG12	R	
2818	Clock asynchronous LOG13	R	
281A	Clock asynchronous LOG14	R	
281C	Clock asynchronous LOG15	R	
281E	Clock asynchronous LOG16	R	
2820	Clock asynchronous LOG17	R	
2822	Clock asynchronous LOG18	R	
2824	Clock asynchronous LOG19	R	
2826	Clock asynchronous LOG20	R	

Tab. 15: Logging Clock Synchronisation

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13.8 Accuracy Test

The accuracy of the meter is done with the pulse LEDs. For testing the following quantity of minimum pulses dependant from the load are recommended:

Load(I)	Min. quantity pulses
I_{st} - I_{tr}	1
I_{tr} - I_{ref}	5
> I_{ref}	10

Tab. 16: Quantity of pulses

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14 EG-Declaration of Conformity

	DZG Metering GmbH
EG-Konformitätserklärung *EC Declaration of Conformity*	Heidelberger Strasse 32 16515 Oranienburg Telefon +49-(0)3301 - 854 - 0 Telefax +49-(0)3301 - 854 - 173 Mittelbrandenburgische Sparkasse, Potsdam (BLZ: 160 500 00) Konto: 37 400 300 37 BIC: WELA DE D1 PMB IBAN: DE81 1605 0000 3740 0300 37

nach EMV-Richtlinie 2004/108/EG   nach Messgeräte-Richtlinie 2004/22/EG (MID)
acc. To EMC Directive 2004/108/EC   *acc to Measuring Instruments Directice 2004/22/EC (MID)*

Hersteller/*manufacturer*
DZG Metering GmbH
Heidelberger Strasse 32
D-16515 Oranienburg

Erklärt hiermit in eigener Verantwortung, dass folgendes Produkt
Certifies on its own responsibility that the following product is

     Produktbezeichnung: Elektrizitätszähler
     Product Designation: Electricity meter
     Typenbezeichnung: WH4013
     Type designation

den Bedingungen der oben genannten Richtlinien- einschließlich deren zum Zeitpunkt der Erklärung geltenden Änderungen- entspricht.
Conform to above mentioned directives including all amendments valid at the moment of issuing this declaration.
Die Konformität des Baumusters (Modul B) mit den unten angeführten Normen wurde festgestellt:
The conformity of the type (Modul B) with the listed standards was ascertained:

     Benannte Stelle (Name/Nummer): CSA Group Bayern GmbH/1948
     Notified Body (name/number)
     Baumusterprüfbescheinigungs-Nr: DE MTP 14 B 003 MI-003
     Type examination certificate number

Das Gerät erfüllt folgende harmonisierte Normen:
The device meets the requirements of the following harmonized standards:

     EMV-Richtlinie 2004/108/EG   MID 2004/22/EG
     EMC Directive 2004/108/EC   *MID 2004/22/EC*
     EN 55022-2006   EN50470-1:2006
     EN 62052-11:2003   EN50470-3:2006
     EN 62053-21:2003

Die Konformitätsbewertung wurde nach Modul D durch den Hersteller vorgenommen:
The conformity assessment was performed by the manufacturer acc. Modul D:

     Benannte Stelle (Name/Nummer): CSA Group Bayern GmbH/1948
     Notified Body (name/number)
     Zertifikats-Nummer: DE MTP 12 D 001 MI-003
     Certificate number

Ort/place, Datum/date: Oranienburg, 11.06.2014

Dipl.- Inform. Ulrich Feldmüller   Dipl. Ing. (FH) Peter Zintl
Geschäftsführer   Geschäftsführer
DZG Metering GmbH   DZG Metering GmbH

Sitz der Gesellschaft Oranienburg, Neuruppin HRB 7193 NP, Geschäftsführer: Ulrich Feldmüller, Peter Zintl   Ust.-Ident-Nr. DE 814351540